

BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

BURTON E. LIVINGSTON, Editor-in-Chief
The Johns Hopkins University, Baltimore, Maryland

Vol. II

APRIL, 1919
ENTRIES 219-370

No. 2

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

219. BATTEN, LILY. Observations on the ecology of *Epilobium hirsutum*. Jour. Ecol. 6: 161-177. 65 fig. Nov., 1918.—Plants of *Epilobium hirsutum* proved themselves capable of responding to external stimuli in the development, early in spring, of a phellogen layer capable of producing cork, concentric layers of aerenchyma, non-concentric aerenchyma, or alternate layers of phelloid and non-phelloid cells. The nature of the response was found to depend directly upon the environment of the plant and the position of the organ concerned, the rhizome showing most plasticity. Plants from dry habitats where they had no aerenchymatous tissue when transferred to water or mud showed in one vegetative season the development of aerenchyma on all rhizoids in mud or water. A transfer from wet to dry habitats showed less complete response and "produced concentric layers of aerenchyma in the part of the shoot below the soil level, although its formation was no longer essential to the life of the plant."

Seeds from water-grown plants with aerenchymatous tissue produced seedlings which in dry habitats showed no trace of aerenchyma. It was shown also that the seeds would germinate either in moist soil or below water level but that the latter gave weak seedlings, the best results coming from a generous supply of moisture without submergence. Geo. D. Fuller.

220. COCKAYNE, L. The importance of plant ecology with regard to agriculture. New Zealand Jour. Sci. Technol. 1918: 70-74. 1918.—The author emphasizes the importance of an intensive study of the plant communities that concern the farmer, citing as an example the tussock grassland, the most extensive of New Zealand pastures. The relation of this plant association to the various factors of its environment, its distribution and its variability are as yet little known and yet such knowledge is most essential to its better management and its higher productivity. Burning has been practiced in order that it may give better results in grazing, although it has not been shown what are the permanent effects upon the duration of the grasses. Even the racial purity of the principal grass, *Poa Colensoi* is not established, in fact, there is evidence that there is included under this name a complex of races differing much in value to the sheep farmer.—The control of the sand dune area is mentioned as another problem essentially ecological in nature but of great economic importance to the farming community. The final point is that nothing is more urgently needed in the interests of New Zealand agriculture than an agricultural survey, conducted along ecological lines, of all lands with a view to their accurate classification for various lines of agricultural development.—Geo. D. Fuller.

221. COCKER, R. E. Principles and problems of fish culture in ponds. *Scientific Monthly* 7: 120-129, 3 fig. Aug., 1918.—This paper is of much interest to plant ecologists, for it appears that pisciculture is in large part applied plant ecology. Plants are the chief oxygenators in confined ponds, but as yet little is known as to the value of one species over another in oxygenation, except that submerged evergreens with finely divided leaves are probably most satisfactory. While it is known that plants directly or indirectly are the basis of fish food we are just beginning to determine which species have the greater food values. The problem of the optimum association of species in a pond is also of the greatest importance.—H. C. Cowles.

222. EMIG, W. H. Mosses as rock builders. *Bryologist* 21: 25-27. Pl. 15. 1918.—Mosses, particularly *Didymodon tophaceus* and *Philonotis calcarea*, have played an important part in the development of the travertine deposits in the Arbuckle Mountains, Oklahoma. The travertine is deposited along streams, principally in connection with water-falls. It is formed by the accumulation on mosses and other water plants of calcium carbonate, which is said to be precipitated from aqueous solution mainly as a result of the diffusion into the air of carbonic acid gas from evaporating water surfaces. The mosses act only indirectly in the precipitation, principally by supplying a larger absorptive and adsorptive surface for the evaporation of the calcareous solution.—G. E. Nichols.

223. FERNALD, M. L. The geographic affinities of the vascular floras of New England, the Maritime Provinces and Newfoundland. *Amer. Jour. Bot.* 5: 219-247. 3 pl. May, 1918.—The region in question, with an area of about 200,000 square miles, possesses an indigenous vascular flora of more than 2900 species and varieties, practically all of which are post-glacial immigrants. Knowledge concerning this flora is not yet sufficiently complete to permit accurate deductions regarding its geographic origin, but the known affinities of certain elements with floras of other regions suggest many problems. In discussing these affinities, emphasis is laid on species of discontinuous range; it is to these, rather than to widely distributed species of nearly continuous distribution over large areas, that the greatest phyto-geographical interest attaches. Considering the flora of this region in relation to floras in other parts of North America, attention is called to the coastal plain element, the Mississippi basin element, the western prairie-plains element, and the western subsaline element (temperate American affinities), and to the circumpolar, Greenland-Laborador, and several north-western elements (boreal affinities). Considering the flora here in relation to floras outside of North America, attention is directed to several distinct Asian, Eurasian, and European affinities, and to affinities with the floras of South America, Polynesia, Australia, and even Africa. A number of illustrative observations are introduced to show the need of further investigations, both extensive and intensive, within the region under discussion.—G. E. Nichols.

224. KARSTEN, G. Ueber Kompasspflanzen. [On compass plants.] *Flora* 111-112: 48-59. 3 pl. 1918.—Author tested by means of a thermoelectric couple the temperature of leaves of *Lactuca scariola* in different positions, finding that vertical leaves perpendicular to the rays of the sun were 7.6° warmer than those parallel to the rays, that horizontal leaves were 3.6° warmer than vertical ones, that leaves twisted from the parallel to the perpendicular position showed an immediate rise in temperature of 4.2° to 6.3°, and that vertical leaves in meridional position showed a marked cooling in the middle of the day, followed by an equally marked increase in temperature as the sun moved into the west in the afternoon. On estimating the transpiration by loss in total weight of small potted plants, he found that transpiration was greater during the afternoon hours. He concludes that the plant is a typical sun-loving species, adapted to utilize the direct rays of the sun, while plants with horizontal leaves are adapted primarily to diffuse light. Various species of *Opuntia* in a glasshouse with light only from the south tended to develop their new growth also in a meridional position. Author states that in low latitudes with consequently high altitude of the sun any vertical position is sufficient to secure direct illumination during the major portion of the day, while in higher

latitudes with lower altitude of the sun a meridional position is necessary. He calls attention to the fact that plants with vertical leaves are relatively common in tropical and subtropical climates, while true compass plants are to be expected only in more northern latitudes.—H. A. Gleason.

225. NEWMAN, L. F., AND R. W. NEWMAN. Some records of the seasonal flora of arable land under cultivation. Jour. Ecol. 6: 178-188. Nov., 1918.—Records throughout the entire summer upon variously tilled fields showed that although the flora was limited to a comparatively small number of species it showed decided and interesting fluctuations. Certain species would suddenly appear in large numbers on a particular field for reasons that could not be explained while there were also equally sudden and inexplicable disappearances. The causes of these phenomena are recognized to be of both economic and ecological importance. The complete disappearance of dead plants is also mentioned as one of the surprises of the investigation and while worms and fungi are among the probable agents, more extensive investigations in the near future are promised.—Geo. D. Fuller.

226. SAMPSON, ARTHUR W. Climate and plant growth in certain vegetative associations. U. S. Dept. Agric. Bull. 700. 72 p., 37 fig. Oct., 1918.—A study of the growth and transpiration of *Pisum arvense*, *Triticum durum*, and *Bromus marginatus*, on the Wasatch Mts. in central Utah. Three stations were located in the Oak-brush (7,100 ft. alt.), the Aspen-fir (9,000 ft. alt.), and the Spruce-fir (10,000 ft. alt.) associations, open spaces being chosen for experimental purposes. In addition to the potometer transpiration measurements, wind velocity, air temperature, precipitation, evaporation, and barometric pressure were also measured and compared with plant growth and the water requirement. Temperatures and temperature summations were greatest in the Oak-brush type and decreased with altitude. Evaporation from the porous cup was most rapid in the Oak-brush and Spruce-fir, the former being due to high temperature and the latter to higher wind velocity. The water requirement was greater in each case in the Oak-brush type, as was also the temperature and evaporation and the sunlight measured by differential evaporation. While the total dry matter produced and the average leaf length were greatest in the Aspen-fir, the period of growth from seed time to flowering was shortest in the oak-brush and increased with altitude. Temperature summation for this period were nearly the same for each of the stations.—H. L. Shreve.

227. SAMPSON, ARTHUR W. Effect of grazing upon aspen reproduction. U. S. Agric. Bull. 711. 29 p., 5 pl., 7 fig. Feb., 1919.—These studies were made at Manti National Forest in Utah and cover a period of five years. On lands bearing a stand of aspen (*Populus aurea* Mill.) it is advisable to maintain a proper balance between grazing and timber reproduction, both because of the value of the timber and the water-shed protection afforded. Aspen is often reproduced with difficulty where the lands were made to serve the double purpose of timber and meat production.

The leafage, young twigs, and branches are browsed by both cattle and sheep. Over 90 per cent of the damage inflicted by stock is chargeable to browsing. Sheep are responsible for severe damage, but the extent of injury by cattle is usually slight except where the lands are overgrazed. Injury by sheep amounted to the death of over one-half of the new growth in heavily grazed areas, and about one-third in lightly and medium grazed areas.

On clean-cut lands, the annual mortality due to sheep grazing is exceedingly heavy. Three years grazing results in the destruction of the entire stand. On lands protected from grazing aspen sprouts are produced during the first two seasons after cutting. On grazed lands a considerable number of sprouts are sent up for three successive seasons.

A surprisingly large proportion of the new growth, even on the most favorable sites is killed during the first three years. Frost, and bark-eating mammals notably gophers, field mice, and rabbits, are mainly responsible for such mortality. Sprouts averaging 45 inches in height are found to be exempt from destructive browsing by sheep. In the case of cattle there is some damage to sprouts between 55 and 60 inches in height, but seldom to those of any greater height. The annual rate of height increment of the aspen production averages

about 15 inches. Hence sprouts three years of age are exempt from serious injury by sheep and those from four to five years of age are free from serious injury by cattle. Aspen is evidently able to reproduce under its own shade. [See Bot. Abstr. 2, Entry 19.]—*H. L. Skaletz*.

FOREST BOTANY AND FORESTRY

RAFAEL ZON, *Editor*

228. LIN, D. Y. **Deforestation and floods in northern China.** Jour. Forestry 16: 888-906 Dec., 1918.—Excerpts are given from engineers that the Chinese floods could be mitigated by the establishment of forests at the headquarters of the river systems with engineering works as aids. Five big waterways of China have a drainage area of 75,000 square miles, 60,000 of which are mountainous, discharging finally in one river which in 1917 rendered 5,611,729 people homeless, 17,646 villages more or less inundated, and flooded an area of 15,000 square miles. The effect of forests on stream flow, erosion and flood is discussed in general terms.—*E. N. Munn*.

229. PICKERING, SPENCER U. **Effect of one plant on another.** Ann. Bot. 31: 181-187 April, 1917.—Experiments were conducted to secure definite data on the production of toxin by growing plants. The experiment consisted of three flower pots with growing mustard plants and a perforated tray arranged to fit over them containing five inches of earth and with an aperture in the center for the plants to protrude through. All the water the plants needed percolated through these trays except in No. 2. Tray No. 3 contained earth without any plants. The perforations in the bottom of Tray No. 2 were blocked so that no water could reach the growing plants. Tray No. 1 also contained a crop of growing mustard plants and the perforations in the bottom were left open so that the washings could pass through them to the plants in the flower pot beneath. In the case of the growth of mustard in flower pots Nos. 2 and 3 there was practically no difference but in No. 1 where the washings from the mustard above had free access the growth was reduced to one-hundredth of their normal size. The conclusion would seem obvious that the leachings from the plants growing in the trays must contain something which is toxic to other plant growth. The author states that by means of pot experiments the following plants have been found susceptible to such influence: apples, pears, plums, cherries, six kinds of forest trees, mustard, tobacco, tomatoes, barley, clover, and two varieties of grasses; whilst the plants exercising this baneful influence have been apple seedlings, mustard, tobacco, tomatoes, two varieties of clover and six varieties of grasses. In no case have negative results been obtained. The extent of the effect varies very greatly; in pot experiments the maximum reduction in growth of the plants affected has been 97 per cent, the minimum 6 per cent, whilst in field experiments with trees the effect may vary from a small quantity up to that sufficient to cause the death of the tree. The average effect in pot experiments may be roughly placed at a reduction of one-half to two-thirds of the normal growth of the plant, but no sufficient evidence has yet been obtained to justify the conclusion that any particular kinds of plants are more susceptible than others or that any particular surface crop is more toxic than another; that such differences exist is highly probable but all the variations observed so far may be explained by the greater or lesser vigor of the plants in the particular experiments in question. Similarly, as regards the effect of grass on fruit trees, though the extent of it varies very greatly, and in many soils is certainly small, we must hesitate to attribute this to any specific properties of the soil in question; for when soils from different localities (including those from places where the grass effect is small) have been examined in pot experiments, they have all given very similar results; and this applies equally to cases where pure sand, with the addition of artificial nutrients, has been taken as the medium of growth.

It is stated that the various possibilities which suggested themselves in explanation of this effect, were excluded one by one until the only possibility left is the formation of some toxic substance. The following are some of the factors which were eliminated:—protective and moisture; alterations in temperature; alkalinity or physical condition of the soil; altera-

ness in its carbon dioxide; and bacterial contents.—The remainder of the article is devoted to showing how these factors among others will eliminate the suggested possibilities. The method of demonstrating how the effect produced is not explained by insufficient food supply is shown as follows:

When a stronger and weaker plant, or an older and younger one, are growing side by side, we find that the latter rarely picks up, and generally gets more and more behind its stronger brother. This cannot be due to the stronger one monopolizing the food supply; for if it exhausted this supply, both plants would suffer at the same time, and, till that supply is exhausted, both would flourish equally. The inadequacy of any such explanation is demonstrated by taking a pot of soil capable of growing, say, six plants, sowing the seed for three of them first, and that for the other three a certain number of days later. In the case of mustard, when the difference of date is only four days, it is found that, at the end of growth, some two or three months later, the last sown plants are 60 to 70 per cent smaller than the others. It is evident that three four-day-old seedlings could not have exhausted the nourishment in 7.5 kilos of rich soil so far as to leave insufficient food for three other seedlings; nor can a difference in age of four days in a total life of several months account for such a difference in the weights of the plants. But the results become clear if we take into account the toxic effect of one plant on the other, for the later planted individuals have to start growth under toxic conditions which were absent in the case of those first planted, and throughout their existence their inferiority in size will make them suffer more than their stronger brethren, though the actual amount of toxin in the soil is the same for all. In working on the factor of root influence it is stated that when a number of plants are grown together in one pot or in one plot in the field, and when the crowding attains to a certain magnitude, the limiting factor is the amount of soil available for each plant, the result of which is that the weights of the plants are inversely proportional to the bulk of the soil available (the soil area) in other words the total plant growth is the same whatever be the number of plants.

E. R. Hodson.

20. SECREST, EDMUND. War time uses of timber. Monthly Bull. Ohio Agric. Exp. Sta. 3: 321-327. Nov., 1918. [Whole no. 35.]—Black walnut for gunstocks and airplanes was a great demand and cooperative methods of handling the sales to make car-load shipments were described. Small trees and shade trees were not needed. White ash for airplanes and handles was greatly needed and the care necessary in getting this material without waste is shown. Oaks were used for artillery, motor truck, and ship-building purposes, and the need for treenails. Care of young growth and the plantation of additional trees are urged.

E. R. Hodson.

21. SECREST, EDMUND. Meeting the wood fuel situation. Monthly Bull. Ohio Agric. Exp. Sta. 3: 291-299. Oct. 10, 1918. [Whole no. 34.]—Information is given on the value of local species for fuel, and the weights of the woods and their equivalents in coal. Information as to machinery, costs, and methods of preparing wood fuel is presented in a popular manner.—*E. R. Hodson.*

GENETICS

GEORGE H. SHULL, *Editor*

22. ANONYMOUS. Wanted, photographs of twins. Jour. Heredity 9: 262. Oct., 1918. —American Genetic Association of Washington, D. C., asks that photographs of twins be sent to its address. Pictures at different ages are especially desired in order to determine degree of resemblance and its persistence through life. Any additional information such as address of known twins who might be willing to cooperate with the Association, is called for. Special interest is shown in difference between identical and fraternal twins. —*H. H. Laughlin.*

23. BABCOCK, E. B., AND R. E. CLAUSEN. Genetics in relation to agriculture. 15 X 23 cm. 222 + 675 p., 239 fig., 4 colored pl. McGraw-Hill Book Co.: New York, 1918. —Review by Spillman, W. J. Jour. Heredity 9: 361. Dec., 1918. [See also Bot. Absts. 1, Entries 210, 229-244.]

234. BAKER, E. EUGENE, AND R. H. COHEN. Variability in the radish. Jour. Heredity 9: 357-361, 384. Fig. 10. Dec., 1918.

235. HOVERI, THEODOR. Zwei Fehlerquellen bei Merogonieversuchen und die Entwicklungsfähigkeit merogonischer und partiellmerogonischer Soeigelbastarde. [Two sources of error in investigations of merogony and the ability of merogonic and partially merogonic searthen hybrids to develop.] Arch. Entwicklungsmech. d. Organ. 44: 417-471. 3 pl. 1918.

236. BRIDGES, C. B. Duplication. Anat. Rec. 15: 357-358. Jan. 20, 1919.—Author's abstract of paper read before American Society of Zoologists at Baltimore, December 27, 1918: "In *Drosophila melanogaster* several cases of abnormal inheritance are accounted for by the assumption that in each case a piece of chromosome has been taken from its normal position and joined to another chromosome.—In the first of these cases a section of the X-chromosome, including the loci for vermilion and sable, became detached from its normal location in the middle of the X-chromosome and became joined onto the 'zero' end (spindle fiber) of its mate. For certain loci this latter chromosome carries two sets of genes—those present in the normal location and also the duplicating set. If a male carries the recessive genes for vermilion and for sable in the normal loci and the wild type allelomorphs in the duplicating loci, he is wild-type in appearance precisely as though he were an XX female heterozygous for vermilion and sable. A female having one such chromosome and a normal chromosome carrying the vermilion and sable genes is triploid for these loci. It has thus been proved that [two] recessive genes may dominate one dominant. A female tetraploid for these loci can be made, and by this means it was shown that two recessives are recessive to two dominants. Criss-cross inheritance of the Abraxas type can be initiated in *Drosophila* by crossing one of the above wild-type females to a vermilion sable (male), for the daughters are vermilion sable and the sons wild-type.—In another case of duplication the duplication piece contains only the locus for sable as far as known. In both of these cases the duplicating piece is joined on at the zero end (spindle-fiber), and experiments can be made in which the linkage of vermilion and sable will indicate a locus at zero instead of at 33 and 43, respectively.—A third case is the transposition of a piece of the second chromosome to the middle (spindle fiber) of the third chromosome. The genes of this duplication piece show linkage to both the second and the third chromosome at the same time. In this third case both the duplicating fragments attached to the III chromosome and the II chromosome that suffered deficiency are on hand. Any gamete that receives this deficient II chromosome dies unless at the same time it receives the third chromosome carrying the missing piece.—The most significant bearing of these cases is upon the idea of evolution of chromosome groups."—Geo. H. Shull.

237. DETLEFSEN, J. A. Fluctuations of sampling in a Mendelian population. Genetics 3: 599-607. Nov., 1918.—Author obtained large number of mice from backcross involving three pairs of Mendelian factors. Ratios in population as a whole were found to agree well with Mendelian expectation, as brought out in another paper. In present paper, it is shown that the distribution of colors within the litters is also in close accord with laws of chance. Pearson's test for goodness of fit is used throughout.—Sexall Wright.

238. DETLEFSEN, J. A., AND E. ROBERTS. On a back cross in mice involving three allelomorph pairs of characters. Genetics 3: 573-598. Nov., 1918.—Authors tested mathematically the conformity of results with Mendelian expectations in a trihybrid cross. Wild gray and pink-eyed brown mice, which are believed to differ in respect to three factors, were mated and resulting hybrids were back-crossed to triple recessive form (pink-eyed brown). In statistical treatment, each monohybrid ratio was first dealt with separately; then each dihybrid combination; finally the trihybrid combinations. These determinations were based upon some 4500 individuals.

Monohybrid ratios were in every case reasonably close to expectation, with no evidence of selective mortality prior to birth. After birth, however, there was selective elimination of non-agouti individuals as compared with agouti.

With one possible exception, recombinations among the three pairs of allelomorphs was purely haphazard, there being no linkage. This exception was a slight apparent tendency toward "repulsion" (i.e., excess of recombinations over parental combinations), when the factors agouti and dark-eye and their allelomorphs are considered. This "suggests slightly different frequencies in the various kinds of maturation divisions."—*F. B. Sumner.*

229. DOWNEY, JUNE E. Standardized tests and mental inheritance. *Jour. Heredity* 9: 311-314. *Fig. 7.* Nov., 1918.—Statement of problem of determining special aptitude in children at early age. Goddard's work in utilizing Binet scale in intelligence as basis of Mendelian studies is mentioned. Need for additional tests for super-normal children is set forth. Five children are described giving results of specific tests for each case. —*H. H. Laughlin.*

240. GATES, WILLIAM H. Another hen that crowed. *Jour. Heredity* 9: 343-347. *6 fig.* Dec., 1918.—See *Bot. Absts.* 2, Entry 670.

241. GLASER, O. C. Inheritance of absence of the sense of smell. *Jour. Heredity* 9: 347. Dec., 1918.

242. GOODALE, H. D. Winter cycle of egg production in the Rhode Island Red breed of the domestic fowl. *Jour. Agric. Res.* 12: 547-574. 1918.—A study of individual egg-records of Rhode Island Red hens associated with a study of length and seasonal distribution of pauses in production, conducted to classify individual hens with reference to their winter cycle. Author reports (1) examination of data published by Gowell confirms statements of Pearl and Surface regarding presence of winter cycle in Barred Plymouth Rock hens; (2) winter cycle is much more characteristic of the Maine flocks than of author's Rhode Island Reds, in which the cycle can be demonstrated in portion of flock only; (3) period of decreased egg-production for Barred Plymouth Rocks and White Wyandottes comes in February, while for Rhode Island Reds it may come in January or February; (4) A pause, or series of pauses, usually exceeding 10 days in length and following a considerable period of egg-production, is best index of existence of winter cycle in the individual Rhode Island Red hen; (5) rate of production does not furnish satisfactory index of presence or absence of winter cycle; (6) evidence is presented which indicates winter cycle may be inherited in some definite but unascertained manner. [*Abst. in Exp. Sta. Rec.* 38: 876. Aug. 9, 1918.] —*Philip Hadley.*

243. GOODSPEED, T. H., AND R. E. CLAUSEN. An apparatus for flower measurement. *Univ. California Publ. Bot.* 5: 435-437. *Pl. 64, fig. 1.* 1918.—Authors give constructional diagrams and methods of use of instrument to expedite linear measurements in biometrical work, especially with flowers.—*J. P. Kelly.*

244. HEAL, JOHN. Hybridization and cross-fertilization of flowers. *Gard. Chron.* 65: 25-26. *Fig. 9.* Jan. 18, 1919.—See *Bot. Absts.* 2, Entry 675.

245. HEGNER, R. W. Variation and heredity during the vegetative reproduction of *Arcella dentata*. *Proc. National Acad. Sci. U. S. Amer.* 4: 283-288. Sept. 1918.

246. HEGNER, R. W. Quantitative relations between chromatin and cytoplasm in the genus *Arcella*, with their relations to external characters. *Proc. National Acad. Sci. U. S. Amer.* 5: 19-22. Jan., 1919.—Studies of nucleo-cytoplasmic and of chromatin-cytoplasmic relations in two species of *Arcella*. Nucleus is of type with chromatin in spherical mass at center. *Arcella dentata* has two nuclei per cell; an individual cut in two gave origin to uni-nucleated progeny that averaged smaller than normal; bi-nucleated condition was later resumed and with it diameter which was characteristic before experimentation: In *A. polyzona* cells of clone 5 had 3 to 7 nuclei; showed marked correlation between diameter of cell and number of nuclei; cells of clone 34 had 5 to 10 nuclei with cell diameter less than those of cells with less number of nuclei in clone 5; quantity of chromatin, however, in specimens of same size in two clones was same regardless of nuclear number. In *A. dentata* diameter of

shell and spine number are correlated with chromatin mass. Author suggests that results of selection in *Diffugia* and *Centropyzis* may have been due to change in quantity of chromatin rather than in quality.—*J. P. Kelly*.

247. IRELAND, ALLEYNE. Democracy and the accepted facts of heredity. A biological view of the Government. *Jour. Heredity* 9: 339-342. Dec., 1918.

248. KIERSLING, L. Einige besondere Fälle von chlorophylldefekten Gersten. [Several special cases of barley defective in chlorophyll.] *Zeitschr. indukt. Abstamm. Vererb.* 19: 196-176. June, 1918.

249. LATHROP, A. E. C., AND L. LOEB. Further investigations on the origin of tumours in mice. V. The tumour rate in hybrid strains. *Jour. Exp. Med.* 28: 475-500. 1918.—"In selecting for hybridization various groups of mice representing a low tumour strain and other groups representing a high tumour strain, there were obtained in the majority of cases hybrid strains with a tumour rate intermediate between that of the parent strains. There does not appear to be a fixed rule as to dominance in the tumour rate. The results of this investigation confirm the authors' previous conclusion that, in the majority of crosses which are observed, the cancer rate is either intermediate between those of the father and mother strain, or that it follows the tumour rate of the parent with the higher rate, and only in a relatively small number of instances the cancer rate follows that of the parent strain with the lower tumour rate." [Abstract from *Physiol. Absts.* 3: 538. Jan., 1919.—*J. C. Drummond*.]

250. LIPPINCOTT, W. A. Pedigreeing poultry. *Kansas Agric. Exp. Sta. Circ.* 67: 16 p., 10 fig. 1918.

251. LOTSY, J. P. Proeven en beschouwingen over evolutie. [Experiments and speculations concerning evolution.] *Genetica* 1: 3-7. Jan., 1919.

252. LOTSY, J. P., H. N. KOGIMAN, AND M. A. J. GORDEWAAGEN. Proeven en beschouwingen over evolutie. I. De Oenotheras als kernchimeren. [Experiments and speculations concerning evolution. The Oenotheras as nuclear chimeras.] *Genetica* 1: 7-69. Jan., 1919.

253. LOTSY, J. P. Over de mogelijkheid van intranucleaire kruising bij homozygoten. [On the possibility of intranuclear crossing in homozygotes.] *Genetica* 1: 92-97. Jan., 1919.

254. LUMSDEN, D. Orchid breeding. *Jour. International Gard. Club* 2: 203-212. 5 fig. 1918.

255. McEWEN, R. S. The reactions to light and to gravity in *Drosophila* and its mutants. *Jour. Exp. Zool.* 25: 49-106. 3 fig. 1918.—A mutant stock of *Drosophila melanogaster* called tan is characterized by loss of positive heliotropism shown by wild flies. This character is recessive and sex-linked; tan mother by wild male gives daughters that are positively heliotropic and sons that are indifferent. When wings of wild fly are cut off at base, fly loses its positive reaction. Mutant races with short wings are less strongly positive. Mutant races with different eye colors react differently to light of different colors.—*T. H. Morgan*.

256. MIDDLETON, AUSTIN RALPH. Heritable effects of temperature differences on the fission rate of *Stylonychia pustulata*. *Genetics* 3: 534-572. 5 fig. Nov., 1918.—Problem is "how living systems may become modified so that the modifications remain in later generations, even after the modifying factors are removed." Infusorian, *Stylonychia pustulata*, multiplying by fission, was subjected to diversities of temperature for various periods. Three series of experiments were carried out. (1) Sixty lines belonging to one clone were kept at 30°-32°C. and sixty at 18°-20°C. Diversities in fission rate occurred; that of specimens kept at higher temperature was 33.47 per cent greater for a 20-day period. Similar difference in fission rate persisted for 16 days after the two groups were brought into room temperature but was lost 31 days later. (2) Lines derived from single specimen were kept at 28°-30°C.

and 6°-9°C. respectively, and samples tested at high, intermediate, and low temperatures at intervals of 20, 40, 60, 120, and 170 days. At 20 days, high line divided more rapidly; at 40 days or more, high line divided more slowly; and at end of 6 months, high line died out but low line was as viable as at first. (3) Samples of lines kept at diverse temperatures for 30 days showed at high temperature a higher fission rate for the high line; at intermediate temperature higher fission rate for low line; and at low temperature, first higher fission rate for low but later for high line.—R. W. Hegner.

257. MÜLLER, H. J. Genetic variability, twin hybrids and constant hybrids, in a case of balanced lethal factors. *Genetics* 3: 422-499. 1 fig. Sept., 1918. Analysis of beaded wing case of *Drosophila melanogaster*. By means of ingenious and precise methods, author has obtained solution of this case, which had been the most difficult one in *Drosophila*. Beaded gene lies in third chromosome; and is dominant in its effect on wings but has recessive lethal effect as in yellow mouse case. Unlike latter case beaded stock bred true in its later history. Author shows that this is due to existence of a lethal mutation in the not-beaded third chromosome of the stock. Stock is thus permanently heterozygous, since the homozygous beaded and the homozygous lethals all die. Case is also complicated by presence of gene that decreases crossing over in this region, thus making heterozygous condition more stable. Permanently heterozygous condition, due to such "balanced lethals," makes possible many curious results. Author has obtained twin hybrids of same type as those occurring in *Oenothera*. He shows that known recessive mutants may be introduced into such stocks, and may remain concealed even while the stock is bred without selection. Occasional crossovers will cause these recessives to appear in small numbers, thus simulating recurrent mutations. "Mutation" of this type may be prearranged to appear with almost any desired frequency. Judging by frequency of occurrence of lethal mutations in *Drosophila*, it seems likely that balanced lethal condition may arise not infrequently. Conclusion is drawn that unusual genetic behavior of *Oenothera*, including large proportion of its "mutations," is due to a complicated case of balanced lethals.—A. H. Startersant.

258. NIEUWLAND, J. A. Teratological notes. *Amer. Midland Nat.* 5: 231. 1918. Abnormal form of *Oenoclea sensibilis* has been found, in which a vegetative frond had changed to a prophyll. Albino plants of *Lobelia siphilitica* and white-flowered specimens of common carnation were collected along shores of Lake Michigan in northern Indiana. J. H. Kempton.

259. POPENOE, PAUL. Will morality disappear? *Jour. Heredity* 9: 269-270. Oct., 1918. Frederick Adams Woods is quoted as authority for statement that morality of members of European royal families, who are parents, is definitely correlated with number of their children who reach age of twenty-one years. Lowest grade of morality had 1.66 children each, the highest had 3.83. Royalty is suggested as good working material because of artificial incentive for all members of royal families to have many children. J. McKeen Cattell is quoted to effect that the two-children family is practically standard among American men of science. A. H. Estabrook's Juke studies show that there were 4.3 children to each fertile degenerate woman. In solution of the problem it is suggested that the sociologist and economist rather than eugenicist should take up the task.—H. H. Laughlin.

260. POPENOE, PAUL, AND ROSWELL H. JOHNSON. Applied eugenics. 14 × 20 cm., v + 453 p., 48 fig. The Macmillan Co.: New York, Oct., 1918.

261. SCHIEMANN, E. Review of: A. HAENICKE. Vererbungsphysiologische Untersuchungen an Arten von *Penicillium* und *Aspergillus*. (Genetical investigations on species of *Penicillium* and *Aspergillus*.) *Zeitschr. Bot.* 8: 225-343. 1 pt., 11 fig. 1916. *Zeitschr. indukt. Abstamm. Vererb.* 19: 310-311. Aug., 1918.—Author found all degrees of constancy or inconstancy of variations in *Aspergillus* and urges a revision of the concept "mutation." Reviewer holds that mutation among higher organisms with sexual reproduction has become entirely definite concept, but that Bacteria hold a unique place because, due to lack of sexuality, inheritance and non-inheritance can not be distinguished. Bacteria should be grouped

therefore with those higher organisms in which sexual reproduction is wanting, not forgetting that persistent modifications may be paralleled with hereditarily constant characters which occur in nearest-related forms with sexual reproduction (*Paramecium*, *Phycomyces*). Each investigator must follow his own taste in such cases, as to which analogy he prefers.—*Gen. H. Shull*.

262. SHAMEL, A. D., L. B. SCOTT, AND C. S. POMEROY. Citrus fruit improvement: A study of bud variation in the Washington navel orange. U. S. Dept. Agric. Bull. 623. 146 p., 19 pl., 16 fig. 1918.—See Bot. Absts. 2, Entry 707.

263. SHAMEL, A. D., L. B. SCOTT, AND C. S. POMEROY. Citrus fruit improvement: A study of bud variation in the Valencia orange. U. S. Dept. Agric. Bull. 624. 120 p., 14 pl., 9 fig. 1918.—See Bot. Absts. 2, Entry 708.

264. SHAMEL, A. D. Bud variation in dahlias. Jour. Heredity 9: 362-364. Fig. 11-12 Dec., 1918.—See Bot. Absts. 2, Entry 706.

265. SHULL, A. FRANKLIN. Symposium on the trends in zoology. 2. The trend of genetics. Rept. Michigan Acad. Sci. 20: 105-108. 1918.—Author sees no increased tendency of genetics toward utilitarian ends as result of war conditions, and thinks this is to be regretted. Mere demonstration that characters Mendelize is no longer sufficient. Fundamental progress can be made now only in relating facts of genetics to other facts of biology. Central theoretic aim of genetics is discovery of method of evolution by study of origin of changes and their preservation. Discoveries of Morgan and his workers should loom large in genetics for many years to come. Concerning genes, future should reveal what they are, whether enzymatic for example; how they produce their somatic effect; whether relatively stable or readily alterable.—*J. P. Kelly*.

266. SHULL, A. F. Environment and inherited characters in *Hydatina senta*. Biol. Bull. 35: 335-350. 1918.

267. STOCKARD, CHARLES R. Hereditary deficiencies in the sense of smell. Science 49: 237-239. Mar. 7, 1919.

268. T. W. Hybridization and cross-fertilization of flowers. Gard. Chron. 65: 46. Jan. 25, 1919.

269. VOORHOEVE, N. Hereditary abnormalities. Lancet 1918 (ii): 740-741. 1918.—"A genealogical chart is presented of a family showing abnormalities through four generations. The survivors, a father and his two daughters, all have brittle bones and blue sclerotics; haemophilia also figures in the family tree, and was present in the father but not in the daughters. The disorders are put down to hereditary inferiority of mesenchyme." [Abst. from Physiol. Abst. 3: 499. Jan., 1919.]—*W. D. H[alliburton]*.

270. WOODS, FREDERICK ADAMS. Will not morality necessarily improve? Jour. Heredity 9: 331-332. Nov., 1918.—Answer to POPENOE's article, "Will morality disappear?" [See Bot. Absts. 2, Entry 259]. Author grants that birth rate among America's biological best has been recently declining rapidly, but hopes that parental instinct will save morality holding that there is correlation between the two. Short criticism of methods in evaluating social leaders is given.—*H. H. Laughlin*.

271. WOODS, FREDERICK ADAMS. Kaiserism and heredity. Jour. Heredity 9: 348-353. 1 chart. Dec., 1918.

272. ZELLER, J. H. A simple hog-breeding crate. U. S. Dept. Agric. Farmers' Bull. 966 4 p., 1 fig. 1918.—Directions for making and operating a hog-breeding crate. Increase the number of successful matings.—*H. K. Hayes*.

HORTICULTURE

W. H. CHANDLER, *Editor*

273. COIT, J. E., AND R. W. HODGSON. **The June drop of Washington navel oranges.**—Bulletin No. 290, California Agric. Exp. Sta. Bull. 290: 203-212. Jan., 1918. —June drop of Washington navel oranges causes an annual loss of \$1,225,000 to \$1,750,000 in California and is the limiting factor in profitable navel-orange production in many parts of the interior valleys of California and Arizona. The drop itself can be separated into two parts, that occurring from petal fall until the fruit is about an inch in diameter, and that occurring after that time. The first part is much the more serious and is due to abnormal water relations which serve as a stimulus to abscission. The second part is less important and is due to the fungus *Alternaria citri* of wide distribution which is also the cause of black rot of navel oranges. The fruits showing the black rot represent those infected fruits which managed to survive to maturity, other infected fruits having fallen, chiefly during the months of July and August. —The water-relations drop bears a definite relation to climatic conditions and all efforts looking toward prevention or control must be either in the nature of modifying environmental conditions, or in selection for dry-heat strains. Of these two the former seems to promise the more immediate results.—*E. O. Essig.*

274. COIT, J. ELIOT. **The etrog or cedrat of the Hebrews.** California Citrograph 6: 3. 3 fig. Nov., 1918.—The only reference to a citrus fruit in the Bible is in Leviticus 23: 40, the word "hadar," translated "goodly trees," referring to the citron which the Hebrews use in their ceremonies at the Feast of the Tabernacles. Since the beginning of the war the supply from Trieste and Greece has been entirely cut off and Jewish rabbis are searching California for specimens. The possibilities of etrog culture in California are considered, the profits being regarded as problematical, although the fruit could be made into candied citron if the demand for etrog fell off.—*I. J. Condit.*

275. HALLIGAN, C. P. **Horticultural notes.** Michigan Agric. Coll. Quart. Bull. 1: 31. Aug., 1918. The author notes the value of acid phosphate in stimulating growth and vigor of young apple trees.—*R. D. Anthony.*

276. HAWLEY, I. **The blooming period in olives and its lessons for the grower.** Fig and Olive Jour. 2: 9-11. 1 fig. April, 1918.—Divides the annual life of the olive into three periods: the first, March 15 to June, constituting the blooming period; the second June 1 to December 15, comprising the period when the fruit is matured and new growth produced; and the third, completing the cycle to March 15, constituting the rest period. Emphasizes the importance of careful observation during the blooming period as at this time more can be learned regarding the general health and thrift of the trees than at any other time. Takes a fruiting branch and traces the stages in the development of flower buds into flowers and on until the fruit is past the critical period, illustrating each stage with a photograph. Discusses the balance existing between energies of the tree going into development of fruit and into production of new wood. Lays alternate habit of bearing to lack of proper balance between the two. Trees bearing too much fruit do not have sufficient strength to develop fruit wood for next season's crop. Finds 162 flower buds on the twig pictured which on basis of 200 fruit bearing twigs to a twenty-year old tree would give 200,000 flowers. Of these flowers nearly 90 per cent are imperfect, possessing only rudimentary pistils. These are commonly called "male" flowers. Only the perfect or "female" flowers set fruit. Of the 162 flowers on the twig in question 8 flowers or 7 per cent set and brought fruit to maturity. Twice this many were set but half subsequently dropped off. Figuring 125 olives to the pound and the maturity of seven per cent of 200,000 flowers, a yield of four tons of fruit to the acre would be obtained. Practical growers know this to be undesirable as, even if possible, the fruit would be undersized. Concludes that a set of 3.5 per cent approaches a normal condition, allowing the tree to develop fruit wood for the next season, and still mature a crop of large-sized fruit.—*R. W. Hodgson.*

277. HAWLEY, I. The pollination and fertilization of the olive blossom. *Fig. and Olive Jour.* 2: 1-2. May, 1918.—Distinguishes between pollination and fertilization, the former constituting the mechanical processes concerned in carrying the pollen grain to the stigma, the latter consisting of the fusion of the two sex cells. The olive is wind pollinated as evidenced by the enormous amount of pollen produced as well as by the absence of nectar and odor and no provision made for insect pollination through morphological adaptations in the flower. Concludes that instead of being beneficial bees are actually detrimental in that the absence of nectar forces them to feed on the pollen itself. Thrips are said to be an aid in effecting pollination. Inadequate pollination is held responsible for smaller quantity of fruit produced in tops of trees. Mentions rains, frost, excessive heat, and strong winds as climatic conditions hindering or preventing pollination. Considers possibility of increasing yields by cross fertilization, stating that there is evidence supporting this idea. Mission and Manzanillo varieties said to be self fertile. Suggests experimental work to prove the point. Places burden for such work upon the Agricultural Experiment Station. Considers the problems concerned with the setting of the fruit of prime importance in such investigational work giving ideas current among growers regarding causes of shedding of immature fruits.—R. W. Holmson.

278. SHAMEL, A. D. Furrow manure method of feeding orange trees. *California Citrograph* 4: 5. 3 fig. Nov., 1918.—The writer answers a number of inquiries regarding the furrow method of distributing manure in citrus orchards. Application during the late summer and fall months is advised, the furrows in general being made from 6 to 8 inches deep.—I. J. Condit.

279. SHAMEL, A. D. Can California produce good grapefruit? *California Citrograph* 3: 153. May, 1918.—The writer when first coming to California became prejudiced against California grapefruit by eating an unripe sample. Later experience with the ripe fruit reversed his first opinion and caused him to make a study of the grapefruit situation.—The conclusions from this study are summarized under four heads:—First. Much of the inferior grapefruit which has in the past been marketed by California comes from trees of inferior strains. These are the result of careless bud selection by the nurseryman. In a careful study of 500 trees in one of the best grapefruit groves of California, 25 per cent of the trees were found to be of inferior strain, bearing round fruits, containing many seeds, and of poor flavor and quality. The best strain of trees in this orchard bore flattened fruit, with thin rinds, abundance of juice of fine quality and flavor, and few or no seeds.—Second. Until five years ago a large part of the California grape-fruit crop was picked in the winter when the fruits were unripe and sour. Since then by allowing the fruit to ripen on the tree and marketing it in the summer, after the Florida crop has been disposed of and before the Porto Rico crop reaches the market, better results have been obtained. Third. All locations are not equally suitable for producing good grapefruit. Best results are obtained on sandy soils and at higher elevations.—Fourth. It is practicable to eliminate much of the poor quality grapefruit in the packing house. Packing house managers should be trained to segregate and pack the fruit of best quality.—The practical way to improve established orchards of Marsh grapefruit is to eliminate trees bearing seeded or poor grade fruit. The way to improve the Marsh variety is to propagate only the best strains. In a seven year study where 9 fruits per tree were cut each year, 19 trees of best strain averaged 2.6 seeds per fruit, while four trees of the rough seeded strain averaged 52.2 seeds per fruit.—C. S. Milliken.

280. SHAMEL, A. D. Better California grapefruit.—*California Citrograph* 3: 94. March, 1918.—During the year 1917 progress was made in many California grapefruit orchards in replacing the poor strains of Marsh Seedless trees by rebudding with the best strains. Budwood from the best strains was made commercially available by the California Fruit Growers Exchange.—The culture of the improved strain of Marsh grapefruit in California has proved profitable. The favorable change in market conditions toward California grapefruit may be attributed to: (1) Shipment of fruit from May to October, when it is ripe, instead of the ship-

ment of immature fruits from December to May. (2) The steady elimination from the orchards of trees producing coarse, thick-skinned, seeded fruits, leaving the trees producing smooth, thin-skinned, commercially seedless fruits. (3) More careful grading and packing. —That the best strain of Marsh grapefruit can be successfully propagated by careful bud selection was clearly shown in a survey made by the author of the groves where attention to this bud selection was practiced either in setting out young trees or in working over old trees. Many of the poor trees now occurring in California orchards have been definitely traced to carelessness in bud selection by nurserymen.—C. S. Miliken.

MORPHOLOGY, ANATOMY AND HISTOLOGY

E. W. SINNOTT, *Editor*

THALLOPHYTES

281. ADAMS, J. F. Origin and development of the lamellae in *Schizophyllum commune*. Mem. Torrey Bot. Club 17: 326-333. Pl. 1, 2 fig. 1918.—In *Schizophyllum* the lamellae originate by formation of endogenous gill cavities in a manner similar in principle to that which Levine finds in *Crocinus micaceus*. The gill cavities are lined from the first by a palisade layer and represent the space between the adjacent halves of two lamellae. Gill cavities split along the lower edge and lamellae are thus formed from the adjacent walls of two gill cavities. The tissue below the gill cavity becomes looser in texture, thus favoring the splitting. The pileus enlarges by growth of primary lamellae and development of additional lamellae formed from gill cavities. It is evident from this method of the origin of the gill cavities as independent tubes, that gills in their essential nature are hymenium-bearing plates between independently originating endogenous gill cavities.—R. H. Denniston.

282. DODGE, B. O., AND J. F. ADAMS. Some observations on the development of *Peridermium cerebrum*. Mem. Torrey Bot. Club 17: 253-261. Pl. 4 6, 5 fig. 1918. Authors made a study of this fungus on *Pinus rigida* in the vicinity of Lakhurst and Toms River, New Jersey. Canker-like swellings were found to be either elongated or circular and were found on trunks up to 18 inches in diameter. At least half of the trunk is very often girdled. Very often effect on host is to produce a fusiform enlargement of the stem while in other cases a bend or knee is formed. Mycelium is uninnate and appears to follow the medullary rays. Haustoria are found especially in phloem and medullary rays. The bark is split by the developing gall and spermatia exude in yellowish droplets. Spermatogonia are not definitely delimited units. It is not possible to determine accurately very long in advance those swellings which will produce aecidia. Gametophoric hyphae are eight or more cells in length. In the canker-like swellings of the New Jersey material no galls were found bearing both aecidiospore and spermatium galls. Mature uredosori were found on seedlings of *Quercus ilicifolia* and *Q. marilandica* which were located within two feet of the infected base of a pine tree. Infections were made on *Quercus ilicifolia*, *Q. marilandica*, and *Q. heterophylla*. [See Bot. Absts. 2, Entry 508.]—E. T. Bartholomew.

283. KYLIN, H. Studien über die Entwicklungsgeschichte der Phaeophyceen. [Studies on development of Phaeophyceae.] Svensk Bot. Tidskr. 12: 1-64. 1918.—A number of observations support the author's contention that the reduction divisions in the Phaeosporae occur in connection with spore formation. Members of this group were grown in culture solutions containing sodium nitrate, and sodium nitrate with potassium phosphate. Fertile *Chorda* was found only in the latter, as were also germinating zoospores of *Stilophora rhizoides* and *Asperococcus bulbosus*. In the latter the author finds a few plurilocular sporangia on the gamete-bearing individuals. These individuals are a little smaller than the spore-bearing plants. In *Ectocarpus tomentosus* the gametes do not copulate but develop parthenogenetically, which condition is believed to be a derived one. In *E. siliculosus* the plurilocular sporangia may produce either gametes or asexual spores, "parthenogenetic gametes," which in turn produce gamete-bearing plants again. The zygote produces a sporophyte and reduc-

tion occurs in the division of the primary nucleus of the unilocular sporangium. Male and female gametophytes, microscopic in size and with their sex organs, are reported for *Chorda filum*. Only one sperm is produced in each antheridium and this has not yet been found free, nor has fusion been observed. Reduction division occurs as in *E. siliculosus*. *Chorda* should be included among the Laminariaceae. The paper concludes with an outline of the various types of alternation of generations in the Phaeosporae.—C. H. Farr.

BRYOPHYTES

284. HAUPT, ARTHUR W. A morphological study of *Pallavicinia Lyellii*. Bot. Gaz. 66: 524-533. Pl. 20-24. 1918.—After a brief note on the relationships of the genus *Pallavicinia* the author describes the morphological features of the widely distributed *P. Lyellii*, devoting especial attention to the sexual organs and the sporophyte. He finds that the development of the antheridium is essentially the same as in the other genera of the anacrogynous Jungermanniales and notes the peculiar involucre structures which are found in connection with the elongated groups of antheridia. In the case of the archegonium he emphasizes the long neck, sometimes containing as many as eighteen neck canal cells, and shows how the characteristic tubular perianth develops after fertilization. In the sporophyte the lower segment found by the first wall in the fertilized egg undergoes very few divisions and forms a haustorial organ, similar to what has been described in *P. Zollingeri* and *Aneura pinguis*. The upper segment forms the bulk of the sporophyte, the differentiation of the sporogenous tissue occurring relatively late; in this respect *P. Lyellii* agrees with the closely related genus *Synphyogyna*. An inconspicuous cap is formed at the apex of the capsule and dehiscence takes place by means of four longitudinal slits, the valves remaining attached at the tip. The figures illustrate fully the various developmental processes described.—Alexander W. Evans.

PTERIDOPHYTES

285. BROWN, E. D. W. Apogamy in *Camposorus rhizophyllus*. Bull. Torrey Bot. Club 46: 27-30. Pl. 2. 1919.—Prothallia of *C. rhizophyllus* were reared from spores in small glass capsules containing 25 cc. of Knop's full nutrient solution. Ten weeks after sowing, a single apogamous sporophyte appeared on one of the prothallia. Normal sporophytes followed later.—J. H. Faull.

286. DARNELL-SMITH, G. P. The gametophyte of *Psilotum*. Trans. Roy. Soc. Edinburgh 52: 79-91. Pl. 1-2. 1918.—Spores of *Psilotum*, sown in the laboratory between pieces of sandstone, and in the field, germinated and the earlier stages in the development of the gametophyte were followed. Mature gametophyte is described as a cylindrical, single or branched, saprophytic body, bisexual, subterranean, light brown in color, radially symmetrical and densely covered with long brown rhizoids. It is best found by carefully searching with a hand lens quantities of soil taken from rock fissures in the habitat of adult plants.—J. H. Faull.

287. LAWSON, A. A. The gametophyte generation of the Psilotaceae. Trans. Roy. Soc. Edinburgh 52: 93-113. Pl. 1-5. 1918.—Author gives a full account of the gametophytes of *Tmesipteris* and *Psilotum*. Both are hypogaeous, $\frac{1}{2}$ inch or more below surface of soil, and are remarkably alike. They are light brown, cylindrical, branched and devoid of chlorophyll. Their tissues are occupied by a mycorrhizal fungus. Antheridia and archegonia are always borne upon the same gametophyte and are not localized in their distribution. Male gametes are multiciliate. Archegonium projects slightly beyond surface and possesses a neck of 4 rows of cells and a single canal cell. In *Tmesipteris*, the archegonia are more densely crowded and are more numerous than the antheridia, whereas the opposite is true of *Psilotum*. Moreover, antheridia and archegonia of *Tmesipteris* are about twice as large as those of *Psilotum*. Author concludes that the gametophyte generation of the Psilotaceae bears no structural resemblance to that of *Lycopodium* or *Equisetum* and that Psilotaceae are phylogenetically very remote from either Lycopodiales or Equisetales. [See Bot. Absts. 1, Entry 973]—J. H. Faull.

SPERMATOPHYTES

288. PULLING, HOWARD E. Root habit and plant distribution in the far north. *Plant World* 21: 223-233. 1 fig. 1918.—Author discusses root habit of some of the common forest trees of the far north. Recognizes two types of root system, deep and shallow, between which various transitions may occur. Presents evidence that some species have a root habit which is rigidly maintained under varying external conditions, whereas in others the root habit is much more flexible. When the root system is deep and inflexible, the species is obviously unable to grow on shallow soils, such as those prevailing in the far north. Degree of flexibility of root habit and degree of penetration may thus be factors in determining northward distribution of many species. Root systems of black spruce, tamarack and canoe birch are classed as rigid and shallow; of white spruce as flexible and shallow; and of jack pine and white pine as deep and rigid.—E. W. Sinnott.

289. SMITH, CHARLES PIPER. Studies in the genus *Lupinus*. II. The Microcarpi exclusive of *Lupinus densiflorus*. *Bull. Torrey Bot. Club* 45: 1-23. 16 fig. 1918.—Same general title. III. *Lupinus densiflorus*. *Bull. Torrey Bot. Club* 45: 167-203. 25 fig. 1918.—These studies of *Lupinus* are from the taxonomic standpoint. Many diagrams of floral parts are given to show diagnostic characters.—Margaret C. Ferguson.

290. HUMBERT, E. P. A striking variation in *Silene noctiflora*. *Bull. Torrey Bot. Club* 45: 157-158. 2 fig. 1918.—Author reports an abnormal seedling in which three seed leaves were produced, and succeeding leaves were arrayed in whorls of three, each leaf of the new whorl being placed above an interval between leaves of the preceding whorl. [See Bot. Abstr. 1, Entry 898.]—V. A. Pease.

291. HASTINGS, G. T. Some abnormal poplar flowers. *Torreya* 18: 16-18. 4 fig. 1918.—A case is reported in which several branches of a pistillate tree of *Populus grandidentata* bore catkins made up of staminate, pistillate, and perfect flowers arrayed without regular order, the flowers at the tips of the catkins being most irregular. There is nothing to indicate that the perfect flowers show reversion to ancestral conditions, the explanation lying rather in some irregularity of chromosome division. Drawings of both normal and abnormal flowers are given.—V. A. Pease.

PATHOLOGY

DONALD REDDICK, Editor

292. BOAS, FRIEDRICH. Zur Kenntnis des Russtaues der Johannisbeere und verwandter Erscheinungen. [Sooty mould of currants and similar manifestations.] *Zeitschr. Pflanzenkr.* 28: 114-116. 1918.—Sooty mould was abundant on currants in 1917. Investigations with microscope and by means of cultures shows that a variety of fungi occur there and in this instance no representative of genus *Fumago* was found. Species of *Dematium* were found almost but *Cladosporia*, sterile mycelia, mucor, yeasts, etc., were found abundantly. Author agrees with Neger (*Flora* 10: 67. 1917) that *Fumago* sp. is rarely present in sooty moulds. In greenhouses, on the other hand, sooty mould is almost always *Fumago*.—D. Reddick.

293. CHRISTIANSEN, JOHANNE. Om alkoholdesinfektion. [Alcohol disinfection.] *Høvelstidende*, Kjøbenhavn 1918: 33-34. 1918.—The description of a series of disinfection experiments with various water-soluble antiseptics, various alcohols and acetone. Especial attention is paid to methyl, ethyl and propyl alcohol, with regard to their use as skin disinfectants. The tables and curves, accompanying the paper, show that the molecular percentage of an alcohol in alcohol-water mixture is the dominant factor and independent of the superficial tension in inhibiting bacterial growth, while the actual bacteria-killing properties are solely dependent upon the superficial tension. Propyl alcohol is found superior to ethyl alcohol, which again is superior to methyl alcohol, the higher homologues of the alcohols of

the same series have not been investigated, for the reason, that they do not mix with water in all proportions, so their practical application is out of question. A more extensive use of propyl alcohol in the place of ethyl alcohol as a skin disinfectant is advocated on the basis of the experiments described. [From abst. by G. H[ansen] in Abst. Bact. 2, Entry 775. 1918.]—*D. Reddick.*

294. DODGE, B. O. Studies in the genus *Gymnosporangium*. II. Report on culture made in 1915 and 1916. Bull. Torrey Bot. Club 45: 287-300. Pl. 8. 1918.

295. FELT, E. P. Key to American gall insects. New York State Mus. Bull. 200. 319 p. 16 pl. 1917. (1918).—This key is arranged with reference to the host plants on which the galls occur and will be of value to those who have occasion to collect and determine plants or to study abnormal plant growths. It is the only reasonably complete publication of the kind in America. There are a total of 1439 species, most of which can be recognized by means of the key, the 250 text illustrations and the 16 full page plates. The publication is indexed both with reference to the host and the parasite.—*Mel. T. Cook.*

296. GAMMIE, G. A. Fungi and disease in plants: A review. Agric. Jour. India 13: 666-670. 1918. Review of: E. J. BUTLER. Fungi and disease in plants.

297. HARVEY, R. B. Hardening process in plants and developments from frost injury. Jour. Agric. Res. 15: 83-104. Pl. A [colored] and 7-11. 1918.—See Bot. Absts. 2, Entries 120, 374.

298. HEMMI, TAKEO. On the Gloeosporiose of *Caladium*. [Text in Japanese] Trans. Sapporo Nat. Hist. Soc. 7: 41-70. Pl. 1. 1918.—The fungus presents a brown discoloration on the leaves of *Caladium* grown in Japan and finally kills the plant. From many cultural experiments the author notices that the fungus in question grows well on a medium acidified with a relatively strong acid. Especial attention was given to tannic acid. Chlamydospores were frequently present under certain condition of the culture media or in a medium which contained some toxic substance. The optimum temperature for the growth of the fungus is about 27-28°C. the maximum is very near to 38°C. and the minimum about 6-7°C. The fungus liquefies gelatine very slowly. The author proposed the name *Gloeosporium Aracearum* for the causal fungus.—*T. Matsumoto.*

299. KUNKEL, L. O. Tissue invasion by *Plasmodiophora brassicae*. Jour. Agric. Res. 14: 543-572. Pl. 61-80, fig. 1-2. 1918.—The work was done to determine the time and nature of infection of crucifers by the club-root organism. It was found that by the use of small paper cylinders or melted paraffin to hold the inoculum in place, not only the roots but also the stems easily become infected. Although clubs may differ greatly in size many of them are alike in shape. They are formed by infection resulting either from direct penetration of the slime-mould, or through distribution of the organism by host cell divisions. The foot hairs as a means of entrance are of no importance to *Plasmodiophora brassicae*. After direct penetration the organism follows no special course but moves in all directions through the bark. Probably on account of the abundant supply of food in the cambium, the plasmodia enter the cambial tissue, where they pass through the very thin walls until finally they reach the stem opposite the point where they originally entered. They also spread up and down the stem. The club thus results largely from the abnormal growth of the infected cambium. The invasion into the cambium brings about a lack of development in the xylem tissue, so that on a warm day the leaves are no longer able to obtain as much water as they transpire and the plant wilts. A ratio of the uninvaded cells and those filled with spores is given and the question of immunity discussed briefly in relation to the cells not infected. A comparison is made of the galls of *Plasmodiophora brassicae* with those of *Spongospora subterranea* and other genera of the Plasmodiophoraceae, with the conclusion that the other genera produce galls morphologically like those described for *Plasmodiophora brassicae* and unlike those caused by *Spongospora subterranea*.—*Charles Chupp.*

300. MURA, SHIKUTARO. On the grain of barley or wheat infected by smut fungus through the flower. [Text in Japanese.] Ann. Phytopath. Soc. Japan. 1: 16-26. 1918.—The grains of barley and wheat infected by smut through the flowers are smaller than those of healthy ones in length, width, and thickness, as well as lower in weight and specific gravity. The mycelium of the fungus is found in the embryo at least 3 days after infection. Smut spores germinate with difficulty on other portions of a flower than the stigma. From the experiments it is doubtful that the mycelium can enter through the walls of pistils. —T. Matsumoto.

301. SCHAFFNIT, E., AND G. VOSS. Versuche zur Bekämpfung des Kartoffelkrebes im Jahre 1917. [Investigations in 1917 on control of potato wart.] Zeitschr. Pflanzenkr. 28: 111-114. 1918.—Attempts were made to kill the organism (*Chrysophyctis endobiotica*) in the soil by treatment of the soil with the following substances the numbers referring to grams or centimeters per square meter. Potash, 300 and 600; lime nitrogen, 80 and 120; sulfur, 30; sodium cyanide 100; "uspulun," 75; betalysol, 150; chromium acid carbonate, 100; chromium acid, 100; formaldehyde, 250 and 500. None gave any indication of control. This confirms work in two previous years (Zeitschr. Pflanzenkr. 26: 182 and 27: 339). Of seventy varieties tested the following, in a test extending over three years, have not shown the disease: Paulsen Juli von 1912, Verb. Lange Sechswöcher, Poppelhurt, Koralle, Lech, Danusia, Lucy, Ada, Edel, Jubelkartoffel, Blaue Rhein, Rauhshalen, Agraria, Concordia, Erika, Marschall, Gwartz, Roland.—Tests in a field not cropped with potatoes since 1909 show that the organism persisted in soil for nine years.—D. Reddick.

302. SHIRAI, MITSUTARO. On the development of plant pathology in Japan. Ann. Phytopath. Soc. Japan. 1: 1-4. 1918.—A brief historical sketch of plant pathology in Japan, especially in Tōkyō, is given.—T. Matsumoto.

303. WILCOX, R. B. Notes on cranberry disease investigations of the Bureau of Plant Industry. Proc. Forty-ninth Ann. Conv. Amer. Cranberry Assoc. 1918: 19-21. 1918. A progress report of investigations on cranberry diseases, largely along the lines of work previously outlined in Bulletin 714 of the U. S. Department of Agriculture, entitled "Spillage of cranberries after harvest."—Neil E. Stearns.

PHYSIOLOGY

B. M. DUGGAR, *Editor*

DIFFUSION AND PERMEABILITY

304. WILLIAMS, MAUD. The influence of immersion in certain electrolytic solutions upon permeability of plant cells. Ann. Bot. 32: 591-599. 1918.—Cells of the petioles of *Nazifraga rubra* immersed in certain concentrations of such electrolytes as aluminum chloride, barium chloride, potassium chloride, potassium nitrate, and barium nitrate, became permeable to 0.2 per cent ferric chloride. Normally these cells are impermeable to ferric chloride of this strength for very long periods. The entrance of the ferric chloride was indicated by its reaction with the tannin contained in the cells. The time of immersion needed to produce abnormal permeability depends upon the concentration and the electrolyte. For aluminum chloride, potassium chloride, potassium nitrate, and barium nitrate results suggest approximately the relation: $\log T = \text{constant} - A (\log C + 1)$, where T = time of immersion needed to render membrane permeable to 0.2 per cent ferric chloride, C = concentration in gram-mols per liter, A = constant depending upon electrolyte used. Abnormal permeability with regard to the ferric chloride could be produced without the membrane becoming permeable to a rose-colored material frequent in the sap of the cells.—S. M. Zeller.

WATER RELATIONS

305. FARMER, J. BRETLAND. On the quantitative differences in the water-conductivity of the wood in trees and shrubs. Part I. The evergreens. Proc. Roy. Soc. London B, 90: 218-222. Fig. 1-2. 1918.—This paper is abstracted under the following entry, 306.

306. FARMER, J. BRETLAND. On the quantitative differences in the water-conductivity of the wood in trees and shrubs. Part II. The deciduous plants. Proc. Roy. Soc. London B, 96: 233-250. Fig. 1-3. 1918.—From extensive investigations the methods of which are described in detail, it is found that the efficiency of the wood of evergreens in conducting water is relatively low as compared with that of deciduous plants. Fluctuations in the case of evergreens are relatively small, while with deciduous plants they are sometimes marked. A considerable difference was noted in the water-conducting capacity of normal adult wood and that of "leaders" of young trees, and the wood of arborescent and frutescent monocotyledonous plants proved defective in water-conductivity. [See also the next preceding Entry, 305.]—R. A. McGinty.

307. FOLSON, DONALD. The influence of certain environmental conditions, especially water supply, upon form and structure in *Ranunculus*. Physiol. Res. 2: 209-276. Fig. 1-2. 1918. [Abstract of this paper was preprinted as Physiol. Res. Prel. Absts. v. 2, no. 5, serial No. 15, 1918.]—This paper describes extensive experiments along the line indicated by the title. Growing *Ranunculus aceleratus* and *R. abortivus* under conditions of water supply varying from submergence of soil and plant to just enough moisture to support life, it was found that they agreed in regard to their relation to water supply in giving progressively smaller values with progressively lower water supply for the following plant features: thickness of stem cortex, thickness of stem aerenchyma, stem bundle interval, petiolar width of root-leaves, and laminar area of root-leaves. The two species did not show any apparent relation to water supply in regard to number of xylem strands in root and in stomatal frequency of upper surface of root-leaves; and they appeared to disagree in their relation to water supply for the following features: root radius, stelar radius of root, thickness of root aerenchyma, stomatal frequency of lower surface of root-leaves, number of layers of chlorenchyma, thickness of root leaf chlorenchyma, number of layers of root leaf palisade, and thickness of root-leaf palisade. [See Bot. Absts. 1, Entry 1484.]—R. A. McGinty.

308. KELSICK, R. E. Some observations on the relation of lint length to rainfall. West Indian Bull. 17: 79-82. 1918.—Observations on the lint length of different strains of St. Island cotton during seasons of varying weather conditions indicate that the length of the lint is dependent upon the water supply of the plant at the critical period of development of the boll.—R. A. McGinty.

309. MCCLELLAND, C. K. The time at which cotton uses the most moisture. Jour. Amer. Soc. Agron. 10: 185-189. 1918.—Cotton requires less total water than corn or oats. An ample supply of water is needed at the time of blossoming and of setting of the bolls. A small water supply induces plants to blossom early. Plants grown in potometers used the largest amounts of water at the time blossoms were appearing rapidly. Suggestions to the practical grower are attempted.—H. S. Reed.

MINERAL NUTRIENTS

310. HENDRY, G. W. Relative effect of sodium chloride on the development of certain legumes. Jour. Amer. Soc. Agron. 10: 246-249. 1918.—Observations upon the effect of sodium chloride on varieties of beans grown in sand cultures plus nutrient solutions. The Windsor bean (*Vicia faba*), the blackeye cowpea (*Vigna sinensis*), and the Mexican garbanzo (*Cicer arietinum*) were less injured by sodium chloride than the other varieties tested. The Lewis lima (*Phaseolus lunatus*), and the white tepary (*P. acutifolius* var. *latifolius*) were less affected by sodium chloride than varieties of *Phaseolus vulgaris* tested. Nodule production was checked to a varying degree in all cases observed.—H. S. Reed.

311. MCINTIRE, W. H. The growth of sheep sorrel in calcareous and dolomitic media. Jour. Amer. Soc. Agron. 10: 29-31. Pl. 1. 1918.—Pot culture experiments show that sheep sorrel (*Rumex acetosella*) maintains a good growth in strongly alkaline soil when not subjected to the intervening influence of clover or other lime-loving plants.—F. P. Halm.

312. SCREINER, O., AND J. J. SKINNER. The triangle system for fertilizer experiments. *Jour. Amer. Soc. Agron.* 10: 225-246. Pl 5-7, fig. 28-41. 1918.—A description of a method of conducting experiments in field or laboratory which has been found useful, especially where three variables are introduced. Presentation of data by such a diagram gives an intelligent and comprehensive view of the results.—*H. S. Reed.*

313. SHUTT, F. T., AND E. A. SMITH. The "alkali" content of soils as related to crop growth. *Trans. Roy. Soc. Canada III*, 12th: 83-97. Fig. 1-5. 1918.

PHOTOSYNTHESIS

314. MOORE, BENJAMIN. The formation of nitrites from nitrates in aqueous solution by the action of sunlight, and the assimilation of the nitrites by green leaves in sunlight. *Proc. Roy. Soc. London B*, 90: 158-167. 1918.—The author reports that dilute solutions of nitrates on being exposed to sunlight or other light of short wave-length, underwent conversion from nitrate to nitrite. On immersing green leaves in the solution, comparatively little nitrite accumulated, due, the author concludes, to the fact that the leaf absorbs the nitrites as they are formed, thus indicating that the early stages of synthesis of nitrogenous compounds are carried out in the green leaf aided by sunlight.—*R. A. McGinty.*

315. MOORE, BENJAMIN, AND T. A. WEBSTER. Action of light rays on organic compounds, and the photosynthesis of organic from inorganic compounds in the presence of inorganic colloids. *Proc. Roy. Soc. London B*, 90: 168-186. 1918.—Certain inorganic systems, such as solutions of ferric salts, uranic salts, silicic acid, beryllium chloride, etc., in the presence of carbon dioxide and on exposure to light, are able to effect the formation of formaldehyde; while ferric sulphate, ferrous chloride, zinc chloride and certain other substances do not bring about this action.—Formaldehyde under various conditions, involving light in each case, gave rise by condensation to substances which had the power of reducing Benedict's solution. This indicated that true carbohydrates would ultimately be formed by this means. An effort was made to get an osazone test with the products formed, but this was unsuccessful. The various sugars, starch, glycogen, egg albumin, milk, and a number of vegetable juices on exposure to sunlight or ultra-violet light showed the presence of formaldehyde, which was assumed to be due to a reversible reaction corresponding to that by which all organic matter has been built up from inorganic sources.—*R. A. McGinty.*

METABOLISM (GENERAL)

316. HORI, S., AND U. BOKURA. Soy bean as a substitute for peptone in the preparation of the nutrient media. *Ann. Phytopath. Soc. Japan* 1: 27-31. 1918.—Since the outbreak of the war the cost of preparing culture media in mycological and bacteriological laboratories in Japan, especially preparing the culture media for mouse typhus bacteria, has greatly increased, therefore the authors studied many materials in order to find an economic substitute for peptone. After many experiments the conclusion was reached that pulverized soy bean cake gave the most satisfactory results, 30 grams of the material being substituted for 20 grams of peptone. As a matter of fact, on this substitute the mouse typhus bacteria exhibit more vigorous growth than on the peptone media. A comparison of prices, an analysis of total nitrogen, and a brief statement of the method of preparation is given. [See Bot. Abs. 2, Entry 1042.]—*T. Matsumoto.*

METABOLISM (NITROGEN)

317. BOTTOMLEY, W. B. The isolation from peat of certain nucleic acid derivatives. *Proc. Roy. Soc. London B*, 90: 39-44. 1918.—A description of methods used in an attempt to isolate nucleic acid from peat is presented, and while no nucleic acid as such was found, the presence of its derivatives is indicative of the decomposition of this compound by bacterial or other agencies.—*R. A. McGinty.*

318. CALL, L. E., AND M. C. SEWELL. The relation of wood growth to nitric nitrogen accumulation in the soil. *Jour. Amer. Soc. Agron.* 10: 35-43. 1918.—It appears from the data

presented that in the past too much emphasis may have been placed on tillage as an agent directly contributing to the formation of nitrates and too little emphasis on it as an indirect means of assisting in the accumulation of nitrates by preventing weeds from using these in their growth. —*P. F. Halma.*

319. WAYNICK, DEAN DAVID. Variability in soils and its significance to past and future soil investigation. I. A statistical study of nitrification in soils. Univ. California Publ. Agric. Sci. 3: 240-279. Fig. 1-2. 1918. —From a study of variability as regards nitrate production, the author concludes that samples of soil taken from even an apparently uniform field, limited in area, vary so widely as to greatly affect the reliability of any series of results. The results indicate that a single sample of soil is of little value as regards determination made upon it, and even a number of samples, as ten or sixteen, may give results which have only a low degree of accuracy. In the experiments reported, eighty-one samples were taken from an area 100 feet in diameter, and these gave results which are considered accurate. Increased variability in behavior of samples of soil in the laboratory, over their variability in the field, and its bearing upon the determinations, is discussed. —*R. A. McGinty.*

METABOLISM (ENZYME ACTION)

320. GREY, EGERTON CHARLES. The enzymes concerned in the decomposition of glucose and mannitol by *Bacillus coli communis*. Part II. Experiments of short duration with an emulsion of the organisms. Proc. Roy. Soc. London B, 90: 75-92. Fig. 1-3. 1918. —A description is given of methods used in experiments in which it was found that *Bacillus coli communis*, acting upon glucose in saline solution, gave decomposition products differing quantitatively from those obtained in earlier experiments when the organism was allowed to grow in a mixture of glucose and peptone. The author concluded from the results obtained that succinic acid, acetic acid, and alcohol have a common origin and that lactic acid is formed independently of the formation of the other three products mentioned. It was also found that the enzymes which affect the decomposition of glucose cooperate in the decomposition of mannitol. —*R. A. McGinty.*

321. GREY, EGERTON CHARLES. The enzymes concerned in the decomposition of glucose and mannitol by *Bacillus coli communis*. Part III. Various phases in the decomposition of glucose by an emulsion of the organisms. Proc. Roy. Soc. London B, 90: 92-99. Fig. 1-2. 1918. —This paper gives further results of a study of the decomposition products of glucose when acted upon by *Bacillus coli communis*. It was found that there were several phases of the fermentation which were correlated with increase and diminution in the number of living bacteria present. During one of the phases, i.e., when multiplication of cells was in progress, there was a transformation of glucose into a more complex substance. —*R. A. McGinty.*

GROWTH AND DEVELOPMENT, REPRODUCTION

322. LEES, A. H. "Reversion" and resistance to "Big Bud" in black currants. Ann. Appl. Biol. 5: 11-27. Fig. 1-14. 1918. —The reversion to the wild type in black currants is characterized by the occurrence of undersized or no fruits, an unusual amount of lateral wood growth, sharp pointed leaves, and long, thin internodes. It is associated with, and apparently caused by, a check to terminal growth brought about by the change of the terminal wood-forming bud into a "Big Bud," a fruit bud, or dead bud. It may be associated with aphid attack. Mite-resistant varieties revert when the wood-forming terminal bud is killed or becomes a fruit bud. Seabrook's Black is mite-resistant because in normal climates and seasons the mite kills the attacked growing point and thus starves itself. This only happens when both climate and variety favor an early and strongly continued check to the growth of the bush. A form of reversion occurring in young bushes before mite or aphid are present is now unaccounted for. Correct pruning and judicious cultural operations are suggested as a possibility for permanent cure. —*S. M. Zeller.* [See Bot. Absts. 2, Entry 1047.]

323. MALLOCK, A. Growth of trees with a note on interference bands formed by rays at small angles. *Proc. Roy. Soc. London B*, 90: 186-199. *Fig. 1-6*. 1918. A description of an accurate method for the determination of the increase in diameter of trees. The method is based upon observations on the interference bands formed by rays of light at small angles. It was found possible to measure increments in diameter occurring during intervals of one day or even one hour, the lowest measurement specified being 0.025 mm. — *R. A. McGinty*.

324. WALWORTH, E. H., AND L. H. SMITH. Variations in the development of secondary rootlets in cereals. *Jour. Amer. Soc. Agron.* 10: 32-35. 1918. The number of secondary rootlets in oats, wheat and barley is not constant. Different varieties of a given cereal show characteristic tendencies in the production of these rootlets, and this tendency is greater in barley than in either wheat or oats. — *F. F. Hulma*.

GROWTH AND TURGOR MOVEMENTS

325. CROZIER, W. J. [Review of: J. LOEB. **Forced movements, tropisms, and animal conduct.** (See next following Entry, 326.) *Monographs on Exp. Biol.* 1: 1-209. *Fig. 1-42*. 1918.] *Science* 49: 171-172. 1919.

326. LOEB, JACQUES. **Forced movements, tropisms, and animal conduct.** *Monographs on Exp. Biol.* 1: 1-209. *Fig. 1-42*. 1918. — This volume, the first to appear in a proposed series, presents an "analysis of the mechanism of voluntary and instinctive actions of animals." * * * "based on the assumption that all these motions are determined by internal or external forces." The work is of interest to plant physiologists inasmuch as it presents briefly the author's views in the general field, although the data serving as the basis of the analysis are drawn almost exclusively (except in the chapter on chemotropism) from experiments upon animals. [See next preceding Entry, 325.] — *B. M. Duggar*.

327. SMALL, JAMES. Changes of electrical conductivity under geotropic stimulation. *Proc. Roy. Soc. London B*, 90: 349-363. *Fig. 1-14*. 1918. — A report of experiments carried out upon the roots of *Vicia Faba* by means of electrical apparatus. From the results obtained the author believes that the mechanism of geotropic response by the root depends upon permeability changes, since the permeability of the cortical cells of both the upper and under sides of the root-tip increases when the root is placed at an angle with the vertical. — *R. A. McGinty*.

TEMPERATURE RELATIONS

328. McCOLLUM, E. V. Influence of heat on growth-promoting properties of food. *Amer. Jour. Public Health* 7: 191-194. 1918. — From a number of experiments, the writer draws the conclusion that the growth-promoting properties of food are not seriously affected by the heat necessary in cooking or canning. The two dietary essentials, called fat-soluble A and water-soluble B, the absence of which, according to the author, may bring about the disease beriberi, are found not to be affected to any great degree by a temperature of 112° to 115°C. — *R. A. McGinty*.

LIGHT RELATIONS

329. BROWNING, C. H., AND SIDNEY RUSS. The germicidal action of the ultra-violet radiation, and its correlation with selective absorption. *Proc. Roy. Soc. London B*, 90: 33-38. *Fig. 1-2*. 1918. — The results of experiments are given in which glass plates similar to ordinary photographic plates were coated with nutrient agar and on these were painted a thin layer of bacterial emulsion. A strip of the plates was then subjected to the action of the ultra-violet spectrum. On incubating the plates at 37°C. for forty-eight hours, it was observed that growth had occurred on part of the exposed strips while none had taken place on the remaining part, the last mentioned result being due to the germicidal action of the rays of that portion of the spectrum striking this part of the plates. The authors concluded from

these observations that ultra-violet radiation between wave lengths 2960 and 2100 Å. is germicidal to bacteria and that rays over this range of wave-length are particularly absorbed by the substances of which bacteria are composed.—R. A. McGinty.

TOXIC AGENTS

330. WALTERS, A. L., W. F. BAKER, AND E. W. KOCH. Studies on protozoöcidal and bactericidal action. Lilly Sci. Bull. 1: 323-345. 1918.—A report of investigations to determine the effect of solutions of several substances upon the action of certain amoebae and bacteria. Solutions of emetine hydrochloride and several others of cephaline, including cephaline iso-amyl ether phosphate, were used.—R. A. McGinty.

MISCELLANEOUS

331. COOK, F. C., AND EDWIN LE FEVRE. Chemical analyses of bacteriological bouillons. Amer. Jour. Publ. Health 7: 587-589. 1918.—Analyses of beef juices with and without the addition of peptone suggest a reason, the author believes, why higher bacterial counts are often obtained on media prepared from beef bouillon and why certain organisms will grow on such media which fail to grow on media made from beef extract.—R. A. McGinty.

332. SHAW, WALTER R. Some microtechnical methods and devices. Philip. Jour. Sci. C, 13: 241-259. Fig. 1-5. 1918.—A description of modifications of various microtechnical methods used by the author, including the use of micrometers, recording magnification of micrographic negatives, concentration of glycerin hastened by the vacuum pump, making sealed glycerin mounts, washing devices for small objects, estimating the number of cells on spheroidal surfaces, etc. [See Bot. Absts. 2, Entry 483.]—R. A. McGinty.

333. VANDERLECK, J. Bacteria of frozen soils in Quebec. II. Trans. Roy. Soc. Canada III, 12^{IV}: 1-21. Pl. 1-5, fig. 1. 1918.—Results of the previous year stand unchallenged by the data of this paper. The conclusion is that in winter no changes take place in soil. Any action of bacteria depends on the enzymes produced. An extra-cellular enzyme acts as long as the bacteria live, but for the influence of an intra-cellular enzyme active growth is necessary. A superficial study has indicated that ammonification and denitrification are produced by extra- and nitrification by intra-cellular enzymes. This would mean that ammonification and denitrification continue in frozen soils even when bacterial development is at a standstill, while nitrification is impossible.—S. M. Zeller.

334. WATSON, W. Sphagna, their habitats, adaptations, and associates. Ann. Bot. 2: 535-551. Fig. 1-5. 1918.—A study of the morphology and ecology of "Sphagna" seems to lead to the conclusion that they obtain their mineral salts from very dilute solutions. They possess a special method of obtaining mineral food by absorbing the base and liberating the acid. In order to do this, special morphological structures apparently of a xerophytic nature furnish the dilute solutions in sufficient quantities and others rid the plants of superfluous acid and water. These structures vary in different groups of *Sphagnum*. During a dry season the intake of water by exposed plants is suspended and the xerophytic structures function to keep the plant in a moist condition until a further supply of dilute solution is available. [See Bot. Absts. 2, Entry 380.]—S. M. Zeller.

TAXONOMY OF NON-VASCULAR CRYPTOGAMS

J. R. SCHRAMM, Editor

BRYOPHYTES

335. BRITTON, ELIZABETH G. West Indian mosses in Florida. Bryologist 22: 2. 1919.—The note records an extension of range for two species.—E. B. Chamberlain.

336. NANZ, RALPH S. The southern limit of *Eucalypta lacinata*. Bryologist 22: 3. 1919.—The note records the occurrence of the moss near Ithaca, New York.—E. B. Chamberlain.

337. WILLIAMS, R. S. *Hylocomium alaskanum* (L. & J.) Kindb. Bryologist 22: 1. Fig. 1-3. 1919.—Descriptive notes, figures of the leaves, and range are given.—E. B. Chamberlain.

338. WILLIAMS, R. S. *Archidium cubense* sp. nov. Bryologist 22: 2. 1919.—A description of a new species of moss related to *Archidium ohioense*.—E. B. Chamberlain.

FUNGI

339. DODGE, B. O. Studies in the genus *Gymnosporangium*. II. Report on cultures made in 1915 and 1916. Bull. Torrey Bot. Club 45: 287-300. Pl. 8. 1918.

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, Editor

PTERIDOPHYTES

340. FITZPATRICK, T. J. The fern flora of northeastern Iowa. Amer. Fern Jour. 8: 97-103. 1918.—This is a list with copious notes of ferns and fern allies collected in northeastern Iowa by the author and other fern students.—Adele Lewis Grant.

341. JENNINGS, O. E. An annotated list of the Pteridophytes of northwestern Ontario. Amer. Fern Jour. 8: 38-50, 76-88. Pl. 3, 1 fig. 1918.—This is an enumeration of the ferns and fern allies collected during five summers spent in northwestern Ontario. A list of the localities explored is included. Two new varieties are described: *Athyrium angustum* (Willd.) Presl. var. *glanduliferum* and *A. angustum* (Willd.) Presl. var. *boreale*.—Adele Lewis Grant.

342. MAXON, WILLIAM R. Further notes on *Pellaea*. Amer. Fern Jour. 8: 89-94. 1918.—Notes on the distribution of several species of *Pellaea* occurring in the United States are recorded. A new name is given to *Pellaea aspera* (Hook.) Baker, i. e., *Cheilanthes horridula*.—Adele Lewis Grant.

343. MAXON, WILLIAM R. Notes on American Ferns. XII. Amer. Fern Jour. 8: 111-121. Pl. 6. 1918.—*Pellaea densa* Hook. (*Onychium densum* Brack.) is placed under *Cheilanthes* and named *C. siligiosa* Maxon. *P. membranacea* Davenp. is also transferred to *Cheilanthes* as *C. membranacea* Maxon. *C. pyramidalis arizonica* is described as a new subspecies and *Athyrium alpestre* var. *americanum* Butters is raised to specific rank as *A. americanum* (Butters) Maxon.—Adele Lewis Grant.

344. MAXON, WILLIAM R. A new hybrid *Asplenium*. Amer. Fern Jour. 8: 1-3. 1918.—*Asplenium Gravesii*, a natural hybrid between *A. Bradleyi* D. C. Eaton and *A. pinatifidum* Nutt. is described. The type was collected near Trenton, Georgia.—Adele Lewis Grant.

345. MAXON, WILLIAM R. *Polystichum Andersoni* and related species. Amer. Fern Jour. 8: 33-37. 1918.—Three species occurring on the Pacific Coast are discussed namely, *Polystichum Andersoni* Hopkins, *P. Jenningsi* Hopkins, and *P. alaskense*, the last being described as new.—Adele Lewis Grant.

346. RANSIER, H. E. More pleasures from old fields. Amer. Fern Jour. 8: 8-12. Pl. 1-2. 1918.—Variations in the fronds of *Compsoorus rhizophyllus* (L.) Link. are illustrated.—Adele Lewis Grant.

347. ROJAS ACOSTA, N. Addenda ad Floram regionis Chaco australis (pars secunda) [Additions to the flora of the southern Argentina region.] Bull. Geogr. Bot. 26: 155-165. 1915.—See Bot. Abst. 2, Entry 365.

348. WEATHERBY, C. A. *Pellaea microphylla* Mett. ex Kuhn. Amer. Fern Jour. 8: 104-108. Pl. 5. 1918.—From a study of *Pellaea microphylla* Mett. in the light of recent collections the author concludes that it is a valid species quite distinct from *P. pulehiella* Fernald, which it has been hitherto associated.—Adele Lewis Grant.

349. VAN ALDERWERELT VAN ROSENBURGH, C. R. W. K. New or interesting Malayan ferns 10. Bull. Jard. Bot. Buitenzorg 28: 1-36. Pl. 1-8. 1918.—Under the above title the author presents the results of extended studies in the Filicales and Lycopodiaceae. Many new species, varieties, and forms are described, and new combinations made among the ferns proper and in the genera *Lycopodium* and *Selaginella*.—J. M. Greenman.

350. VAN ALDERWERELT VAN ROSENBURGH, C. R. W. K. Two critical fern genera. Bull. Jard. Bot. Buitenzorg 28: 57-64. Pl. 9. 1918.—A brief discussion is given of *Angiopteris* Hoffman and *Lecanopteris* Blume, accompanied by a key to the Malayan species of these genera.—J. M. Greenman.

351. VAN ALDERWERELT VAN ROSENBURGH, C. R. W. K. Two new fern genera. Bull. Jard. Bot. Buitenzorg 28: 65-66. Pl. 10. 1918.—Two new genera are proposed namely, *Nematopteris* with one species, *N. pyxidata*, based on *Scleroglossum pyxidatum* v. A. v. R. (ibid. 16: 37. Pl. 9. 1914) and *Thysanobotrya* also with one species, *T. arfakensis*, based on *Polybotrya arfakensis* Gepp in Gibbs Contrib. 71.—J. M. Greenman.

SPERMATOPHYTES

352. BUSCALIONI, LUIGI, AND GIUSEPPE MUSCATELLO. Studio monografico sulle Specie americane del Gen. *Saurauia*, Willd. [A monographic study of the American species of the genus *Saurauia* Willd.] Malpighia 28: 315-330. 1918.—Buscalioni and Muscatello continue their consideration of the genus *Saurauia*; and the present article consists mainly in contrasting certain species and varieties already published, particularly *S. leucocarpa* Schlecht., *S. pedunculata* Hook., *S. Rusbyi* Britt., *S. barbigera* Hook., *S. pseudopringlei* Buse, and its variety *fluviatilis* Buse, *S. pseudopedunculata* Buse, and *S. pauciflora* Rose.—J. M. Greenman.

353. CARDOT, J. Rosacées nouvelles d'extrême-orient. [New Rosaceae from the Far East]. Not. Syst. 3: 345-352. 1918.—The following new species and new varieties are described: *Pirus Halliana* Voss, var. *obtusiloba*, *P. laosensis*, *P. Pashia* Ham. var. *obtusiloba*, and *grandiflora*, *P. Koehnei* Schneid. var. *rossolocalyx*, *P. Jacquemontiana* Dene. var. *longipes*, *P. granulosa* Bertol. var. *turbinata*, *P. asteria*, *P. coronata*, *P. tibetica*, *P. hypoglauca*, *P. glabrescens*, *P. oligodonta*, *P. Munbeigii*, and *P. foliosa* (Wall. p. p.) var. *subglabra*.—J. M. Greenman.

354. CONZATTI, CASIANO. Exploracion botanica por la costa meridional de Oaxaca. [Botanical exploration from Oaxaca to the southern coast.] Bol. Dir. Estud. Biol. 2: 309-325. Pl. 7. 1918.—The author gives an account of a botanical expedition from the City of Oaxaca to Puerto Angel on the southern coast of the State of Oaxaca. The article is illustrated by several photographic reproductions and a map showing the itinerary. A list of the plants collected is appended.—J. M. Greenman.

355. GAGNEPAIN, F. *Eugenia* nouveau d'Indo-Chine. [New *Eugenia* from Indo China.] Not. Syst. 3: 321-336. 1918.—The present pages continue from a previous number of the Notulae (ibid. 316-320. 1917) the enumeration of new species of *Eugenia* from Indo China. The following species are published as new to science: *Eugenia circumscissa*, *E. cochinchinensis*, *E. compongensis*, *E. Deckertii*, *E. eburnea*, *E. Finetti*, *E. glomerulata*, *E. Harmandii*, *E. laosensis*, *E. laosensis* var. *quercensis*, *E. leucocarpa*, *E. mekongensis*, *E. nigrans*, *E. pachyloba*, *E. Pierrei*, *E. resinosa*, *E. Tramnion*, *E. sphaerantha*, *E. Thorelii*, *E. tinctoria*, *E. tonkinensis*, and *E. Zimmermannii* Warburg.—J. M. Greenman.

355. HUTCHINSON, J. *Eriargyrea aggregata*. Curtis's Bot. Mag. Pl. 8753. 1918.—This new species of the Compositae is described and illustrated from specimens grown at the Royal Botanic Gardens, Kew, England. It is a native of Angola, southwestern Africa. —*Adel. Lewis Grant*.

357. JUMELLE, HENRI. Les *Dypsis* de Madagascar. [The *Dypsis* of Madagascar.] Ann. Mus. Col. Marseille III, 6: 21-38. Pl. 5. 1918.—The author presents a synoptical revision of *Dypsis*, a small genus of the Palmaceae. Nineteen species are recognized as occurring in Madagascar, of which the following are published as new: *Dypsis nanaraneensis*, *D. p. ocrea*, *D. littoralis*, *D. angusta*, *D. viridis*, *D. linearis*, *D. pleurisetia*, *D. monostachya*, *D. nasolacensis*, *D. fasciculata*, and *D. longipes*.—*J. M. Greenman*.

358. LECOMTE, HENRI. Genre nouveau de Sapotacées. [A new genus of the Sapotaceae.] Not. Syst. 3: 336-345. Text fig. 2. 1918.—*LeMonniera* is published as a new genus from Africa. Three species are recognized namely, *LeMonniera ogouensis* (*Mimusops ogouensis* Pierre, *Lecomtedora ogouensis* Dubard) from French Congo, *L. chlandulifolia* (*Mimusops chlandulifolia* A. Chev.) from the Ivory Coast, and *L. Batesii* (*Mimusops Batesii* Engl.) from Cameroon.—*J. M. Greenman*.

359. MAIDEN, J. H. The forest flora of New South Wales. Vol. VII. Part 2 [Part LXII of the complete work], pp. 39-75. Pl. 232-235. 1918. William Applegate Gullick. Sydney. The present part contains descriptions, notes, and illustrations of *Brachyglottis acerifolia* F. v. M., *Eucalyptus rostrata* Schlecht., *Acacia Mahellae* Maiden, *Callistemon rubiginos* DC., and *C. brachyandrus* Lindley. A chapter is also included under the caption "Adventitious roots (including notes on stilt-roots, lenticels, pneumatophores; swamp plants)," illustrated by several photographic reproductions. —*J. M. Greenman*.

360. MARLOTH, RUDOLF. Notes on the genus *Mystroptalon* Harv. [Balanophoraceae]. South African Jour. Sci. 14: 274-286. Fig. 1-18. 1918. From the study of a series of specimens, the author concludes that there is only one valid species of *Mystroptalon* namely, *M. Plumii* Harv. The other published species, *M. Polakianum* Harv. and *M. Solmsii* Harvey-Gibson, represent two extreme forms and are reduced to synonymy. —*Adel. Lewis Grant*.

361. NELSON, J. C. A new form of *Prunella vulgaris*. Amer. Bot. 24: 82-85. 1918. The author describes a white-flowered form occurring in Oregon, as *Prunella vulgaris* L. var. *catrescens* Fernald forma *alba*.—*Adel. Lewis Grant*.

362. OCHOTERENA, ISAAC. Una nueva especie de Mamilaria. [A new species of Mamilaria.] Bol. Dir. Estud. Biol. 2: 355-356. Fig. 1-3. 1918. A new species of cactus, *Mamilaria Ocamponis*, is described and figured from Mexico. —*J. M. Greenman*.

363. PAU, C. Hieracios catalanes. [Hieraciums of Catalonia]. Bol. R. Soc. Española Hist. Nat. 18: 505-507. 1918.—Record is made of several species and varieties of *Hieracium* occurring in northeastern Spain, and two new hybrids are characterized. These have been designated binomially as follows: *Hieracium ortomistum* (H. *murorum* L. var. \times *Neocerintho* Pau) and *H. abadesicolum* (H. *murorum* L. var. \times *Neocerintho* Pau). —*J. M. Greenman*.

364. PAC, D. CARLOS. Notas sueltas sobre la flora matritense. [Notes on the flora of Madrid.] Bol. Soc. Aragonesa Cienc. Nat. 17: 150-156, 190-197, 208-211. 1918. The author continues his records on the Spanish flora and gives copious notes. Several new species and varieties are characterized.—*J. M. Greenman*.

365. ROJAS ACOSTA, N. Addenda ad Floram regionis Chaco australis (pars secunda). [Additions to the flora of the southern Argentina region.] Bull. Geogr. Bot. 26: 155-165. 1918.—The following new species of vascular cryptogams and seed-plants are described: *Adiantum fossarum*, *Polypodium medicinale*, *Epidryopteris Leptodermis*, *Lilaea superba*,

Bambusa chacoensis, *Atropis palustris* gen. et sp. nov. Aracearum, *Herreria tuberosa*, *Cephaelis tectorum*, *Commelina cyanantha*, *Nidularium hydrophorum*, *Quesnelia chacoensis*, *Stenorrhynchium vulnerarium*, *Ficus speciosa*, *F. Rojasii* Lévl., *Cecropia ambaci*, *Mimosa sparsifera*, *Sapium Rojasii* Lévl., *Nectandra nigra*, *Coccoloba corrientina*, *Petiveria corrientina*, *Rollinia odoriflora*, *Bulnesia Gancedoi*, *Sida Rojasii* Lévl., *Platorhedia pacuri*, and *Lepicostis americana*.—J. M. Greenman.

366. ROLDAN, ANGEL. Los Árboles indígenas que ataca el muerdago en el Valle de México. Datos para la flora forestal del Distrito Federal. [The indigenous trees which are attacked by the mistletoe in the Valley of Mexico. Data for a forest flora of the Federal District. Mem. Soc. Alzate 37: 17-21. 1918.—The author discusses some of the facultative parasites occurring on certain trees in the Valley of Mexico. *Phoradendron brachystachyum* Oliv. is found on *Alnus acuminata* HBK. and *P. velutinum* Oliv. attacks *Crataegus*, *Casimiroa Frazinus*, *Prunus*, *Quercus*, and *Salix*.—J. M. Greenman.

367. ROLFE, R. A. *Angraecum gracilipes*. Curtis's Bot. Mag. Pl. 8758. 1918.—A new white-flowered epiphytic orchid, native of Madagascar, is described and illustrated from specimens grown at the Royal Botanic Gardens, Kew, England. It has been confused hitherto with *A. recurvatum* Thouars.—Adele Lewis Grant.

368. ROLFE, R. A. *Bulbophyllum sociale*. Curtis's Bot. Mag. Pl. 8761. 1918.—*Bulbophyllum sociale* is described and illustrated from specimens grown in the Royal Botanic Gardens, Kew, England. The plant was originally imported from Sumatra.—Adele Lewis Grant.

369. SCHAFFNER, JOHN H. Additions to the catalog of Ohio vascular plants for 1917. Ohio Jour. Sci. 18: 99-100. 1918.

370. SMITH, J. J. Die Orchideen von Java. Fünfter Nachtrag. [The orchids of Java. Fifth supplement]. Bull. Jard. Bot. Buitenzorg 26: 1-135. 1918.—The present article includes descriptions of the following orchids published as new to science: *Nerrillea Winkleri*, *Leconorchis pauciflora*, *L. multiflora*, *Oberonia nitidicauda*, *Microstylis lobatocallosa*, *M. purpureoerectum*, *M. cuprea*, *M. longidens*, *M. foetida*, *Liparis angustiflora*, *Agrostophyllum tenue*, *Cerrostylis sulcata* Bl. var. *flavescens*, *Dendrobium exsculptum* T. & B. var. *purpureum*, *D. Jacobsonii*, *E. tjadasmalangensis*, *E. Koordersii*, *Bulbophyllum tjadasmalangense*, *B. javanicum* (*Epierianthes javanica* Bl.), *B. scottifolium*, *B. peperomiifolium*, *B. distans*, *B. Winklerii*, *B. hamatipes*, *B. submarmoratum*, *B. gomphreniflorum*, *B. rubiferum*, *Phalenopsis javanica*, *Chromochilus tjadadapensis* gen. et sp. nov., *Sarcochilus fraternus*, *Thrixperma roseum*, *T. batuense* J. J. S. var. *javanicum*, *Saccolabiopsis Bakhuiizenii* gen. et sp. nov., *Saccolabium galbium*, *Trichoglottis Winkleri* J. J. S. var. *minor*, *T. maculata*, *Sarcanthus fuscus*, *Microsaccus affinis*, *Microtatorchis javanica*, *M. papillosa*, *Taeniophyllum proliferum*, *T. Bakhuiizenii*, *T. radiatum*, *T. aurantiacum*, and *T. rostellatum*.—J. M. Greenman.

